CLAIMS

What is claimed is:

1. An optical module package comprising:
a housing;
a plurality of optical fiber connectors; and
a plurality of optical fiber cables, each of the optical fiber cables connecting the housing and a corresponding optical fiber connector, said each of the optical fiber cables comprising
an optical fiber rigidly connected to the housing and to the corresponding optical fiber connector,
a flexible inner protective tube enclosing the optical fiber, and
a flexible outer protective tube enclosing the inner protective tube, wherein the inner protective tube and the outer protective tube are longitudinally movable relative to the optical fiber along at least part of the optical fiber in response to environmental temperature changes, to reduce a strain on the optical fiber caused by thermal expansion of the inner protective tube and the outer protective tube.

2. The optical module package of claim 1, wherein the inner protective tube comprises at least two distinct segments separated by a longitudinal gap.

3. The optical module package of claim 1, wherein the inner protective tube comprises an inner tube region situated within the housing and longitudinally movable relative to the housing.

4. The optical module package of claim 3, wherein a region of the inner protective tube proximal to the corresponding optical fiber connector is rigidly connected to the corresponding optical fiber connector.

5. The optical module package of claim 3, wherein the outer protective tube comprises an outer tube region situated within the housing and longitudinally movable relative to the housing.

6. The optical module package of claim 3, wherein a region of the outer protective tube proximal to the corresponding optical fiber connector is longitudinally movable relative to the corresponding optical fiber connector.

7. The optical module package of claim 1, wherein a region of the inner protective tube proximal to the corresponding optical fiber connector is longitudinally movable relative to the corresponding optical fiber connector.

8. The optical module package of claim 7, wherein the inner protective tube comprises an inner tube region situated within the housing and rigidly connected to the housing.

9. The optical module package of claim 7, wherein the outer protective tube comprises an outer tube region situated within the housing and longitudinally movable relative to the housing.

10. The optical module package of claim 7, wherein a region of the outer protective tube proximal to the corresponding optical fiber connector is longitudinally movable relative to the corresponding optical fiber connector.

11. The optical module package of claim 1, wherein the outer protective tube comprises a outer tube region situated within the housing and longitudinally movable relative to the housing.

12. The optical module package of claim 1, wherein a region of the outer protective tube proximal to the corresponding optical fiber connector is longitudinally movable relative to the corresponding optical fiber connector.

13. The optical module package of claim 1, further comprising a longitudinal guide disposed over the outer protective tube, for constraining the outer protective tube solely to a longitudinal motion within the housing.

14. The optical module package of claim 1, wherein said each of the optical fiber cables comprises a flexible sliding medium disposed between the inner protective tube and the outer protective tube.

15. The optical module package of claim 14, wherein the sliding medium comprises aramid fibers.

16. The optical module package of claim 14, wherein the sliding medium is affixed to the housing and to the corresponding optical fiber connector.

17. The optical module package of claim 1, further comprising a fused fiber coupler situated within the housing and rigidly connected to the optical fiber.

18. The optical module package of claim 1, further comprising an optical component situated within the housing and optically coupled to the optical fiber, the optical component being selected from a group consisting of splitters, isolators, circulators, attenuators, switches, and wavelength multiplexing and demultiplexing components.

19. An optical system comprising:
an optical source;
an optical receiver; and

an optical module package optically connecting the optical source to the optical receiver, the optical module package comprising

a housing;

a plurality of optical fiber connectors including a first connector connected to the optical source, and a second connector connected to the optical receiver; and

a plurality of optical fiber cables, each of the optical fiber cables connecting the housing and a corresponding optical fiber connector, said each of the optical fiber cables comprising

an optical fiber rigidly connected to the housing and to the corresponding optical fiber connector,

a flexible inner protective tube enclosing the optical fiber, and

a flexible outer protective tube enclosing the inner protective tube, wherein the inner protective tube and the outer protective tube are longitudinally movable relative to the optical fiber along at least part of the optical fiber in response to environmental temperature changes, to reduce a strain on the optical fiber caused by thermal expansion of the inner protective tube and the outer protective tube.

20. An optical module package comprising:

a housing;

a plurality of optical fiber connectors; and

a plurality of optical fiber cables, each of the optical fiber cables connecting the housing and a corresponding optical fiber connector, said each of the optical fiber cables comprising

an optical fiber fixedly connected to the corresponding optical fiber connector and extending into an interior of the housing,

a flexible inner protective tube enclosing the optical fiber and connected to the housing, and

a flexible outer protective tube enclosing the inner protective tube and fixedly connected to the housing, wherein the optical fiber is capable of longitudinally moving relative to the inner protective tube, the outer protective tube, and the housing in response to environmental temperature changes, to reduce a strain on the optical fiber caused by thermal expansion of the inner protective tube and the outer protective tube, wherein longitudinally moving the optical fiber varies an extent of the optical fiber present in the interior of the housing.

21. The optical module package of claim 20, further comprising a plurality of guide rails situated in the interior of the housing and positioned to prevent the optical fiber from touching the housing.

22. The optical module package of claim 20, wherein the inner protective tube is fixedly connected to the housing.